The Next Drilling Disaster?

Unregulated natural gas drilling could wreak havoc on the environment and human health.

by KARA CUSOLITO

A tour of Dimock, Pennsylvania, with Victoria Switzer is a bumpy ride over torn-up roads, around parking lots filled with heavy machinery and storage tanks, and past well pads that not long ago were forests. The winter here was quiet, but with the thawing ground came the return of the rigs, the trucks, the constant noise and lights of a twenty-four-hour-a-day gas drilling operation. "It's a modern-day Deadwood out here," Switzer says, likening the activity to the gold rush. "No rules, no regs, just rigs."

The "occupation," as she calls it, hasn't just transformed Dimock into an industrial hub; it has also damaged the local water supply and put residents' health at risk. After a stray drill bit banged four wells in 2008, Switzer says, weird things started happening to people's water: some flushed black, some orange, some turned bubbly. One well exploded, the result of methane migration, and residents say elevated metal and toluene levels have ruined twelve others. Then, in September 2009, about 8,000 gallons of hazardous drilling fluids spilled into nearby fields and creeks. The contamination and related health problems have prompted fifteen families to file suit against Cabot Oil and Gas, the primary leaseholder in the area, alleging fraud and contract violation and seeking to stop the damage from spreading.

If she could do it all over again, Switzer says, she never would have signed the 2006 drilling lease that helped open Pandora's Box here. But at the time, she'd never heard of hydrofracking—the Cabot representative didn't mention the word to her when he gained the rights to drill on her land. The story of gas drilling in Dimock begins more than a mile below the earth's surface in the Marcellus Shale, a huge rock formation that extends from New York to Tennessee. Some geologists estimate that the Marcellus contains enough shale gas to power the United States for two decades. But the gas is caught in millions of tiny pores and can be extracted only through hydraulic fracturing, or hydrofracking, a controversial process that requires blasting millions of gallons of water, sand and toxic chemicals deep underground to create fissures that open the pores and free gas to rise to the surface.

Hydrofracking is a hugely lucrative and rapidly expanding industry—the consulting firm PFC Energy recently reported that shale gas production accounts for about 10 percent of US natural gas production, up from 1 percent in 2000. It is bolstered not only by a powerful lobby but also by growing awareness of the threats posed by climate change and America's dependence on foreign oil. In recent years, a broad coalition of energy analysts and government officials have embraced domestic natural gas as a promising "bridge fuel" that could help smooth the transition from more carbon-intensive fossil fuels like oil and coal to renewable energy sources like solar and wind. The catch, though, is that the natural gas industry shares the same history as other energy industries operating in the United States. A string of recent disasters—including the TVA coal ash spill, the Massey coal mine explosion and the Deepwater Horizon oil spill—have demonstrated all too vividly that failure to regulate and oversee resource extraction can lead to catastrophe. Some fear that Dimock is the first natural gas casualty, an early warning of what could happen on a much larger scale if fracking spreads unchecked to other residential areas in the Marcellus region and across the country.

KEITH SRAKOCIC/AP PHOTO

A drilling rig used to extract natural gas from the Marcellus Shale in Houston, Pennsylvania

For a long time, shale gas was thought to be unattainable. But in the 1990s, first in Texas and later in other Western states, new drilling techniques, sophisticated technology and industry exemptions from environmental laws paved the way for economically viable fracking. Many of those exemptions—from provisions in the Clean Air Act, the Clean Water Act, the Superfund Act and the Resource Conservation and Recovery Act—are longstanding. The most notable among them was introduced by Vice President Dick Cheney as an amendment to the 2005 energy bill. The so-called Halliburton Loophole, named after Cheney's former employer and the company that pioneered the fracking process in the 1940s, stripped the EPA's authority to regulate hydrofracking through the Safe Water Drinking Act. Companies were essentially given free rein to drill however and wherever they see fit, and to use and dispose of proprietary fracking fluids without any disclosure or safety requirements. The only remaining shred of federal oversight

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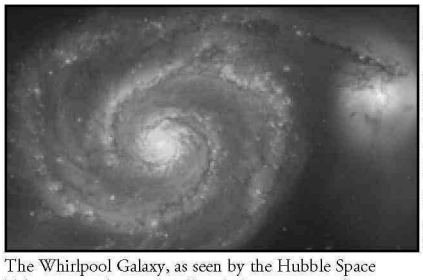

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The Whirlpool Galaxy, as seen by the Hubble Space Telescope, is about 25 million light-years away from us.

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was a voluntary agreement with the three largest companies not to use diesel fuel—which they proceeded to ignore.

Drilling is now regulated entirely at the state level, where there is not nearly enough manpower to handle the volume of wells. In 2008 thirty-five inspectors were responsible for more than 74,000 wells in Pennsylvania (with promises to hire sixty-eight more as Marcellus drilling grows); nineteen inspectors covered more than 13,000 wells in New York; and twenty-four oversaw more than 64,000 wells in Ohio.

With staff stretched so thin, it's nearly impossible to get the job done well, says Dusty Horwitt, a senior counsel for the Environmental Working Group. In January Horwitt released a study warning that regulators in several drill states—including Pennsylvania and New York—don't check to see if companies are using diesel or other harmful distillates. He also found that many state EPA officials are unclear on the stipulations surrounding fracking regulation. In many cases, the report estimates, the concentration of petroleum distillates used in a single well could be enough to contaminate 650 million gallons of water—the same amount consumed daily by New York City residents. In a worst-case scenario, the amount of distillates in a well could be enough to pollute more than 10 billion gallons of water.

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Keeping track of the materials used in fracking is crucial, says Theo Colborn, a Colorado-based endocrinologist who monitors the impact of industrial chemicals on human health. "It's the same kind of very high-tech stuff that we use in airplanes," she explains. "If we didn't use some very dangerous stuff in airplanes, as hydraulic fluids to reduce friction, we wouldn't be flying." Colborn has been researching hydrofracking operations since 2004. Of the 246 products on a partial list of drilling and fracking chemicals used in Colorado, obtained with help from the Oil and Gas Accountability Project, she found that 228 have at least one adverse health effect. Most are known to have multiple negative health impacts, and many are endocrine disruptors, which cause developmental, reproductive and neurological harm. She also found diesel and benzene, which is a carcinogen and is toxic at very low levels.

When a well is fracked—each well is generally fracked up to ten times—between 15 and 40 percent of the mix flows back to the surface. Companies operating in the Marcellus, which is naturally radioactive, must find a way to dispose of thousands of gallons of water, toxic chemicals, brine and radium. There are several ways things can go wrong, Horwitt says. Fluids can be spilled during transport, they can travel underground through natural or man-made fractures, or they can contaminate nearby areas if they're not stored properly.

There are many ways to dispose of the stuff: injection wells, evaporation pits, wastewater treatment plants and dumping, which are allowed by industry exemptions from environmental laws. Companies choose which method to use based on the amount of waste they have and the resources available, says Lee Fuller, a top lobbyist for the Independent Petroleum Association of America (IPAA).

Injection wells, which were recently linked as a possible cause of minor earthquakes in fracking towns along the Texas Barnett Shale, aren't being used in Dimock, according to Switzer. But she says that companies dump waste into creeks and ponds, or into pits lined with thin plastic. Pits that are not lined will eventually leach into groundwater, and pits that are lined can easily tear, leak and have the same effect, says Colborn. Even those that are properly sealed can still release dangerous gases into the air. In recent years, she explains, hydrofracking in Wyoming has raised ozone levels, which can lead to serious respiratory problems. A resident-funded health survey and air quality study in the tiny drilling town of Dish, Texas, revealed dangerously high levels of benzene, toluene and xylene in the air.

Walter Hang, a toxicologist who runs a web-based toxics mapping company in Ithaca, New York, worries that the current infrastructure can't handle the scale of these operations. "Anytime you have industrial activity, you're going to have problems—there's no way around it," he says. "You have tremendous volumes of wastewater, you have thousands of truck trips, and it's really heavy-duty." Hydrofracking requires millions of gallons of chemically treated water to be on site at all times. And wastewater plants can't handle fracking fluids properly, says Hang, because there is such a high concentration of chemicals and radioactivity.

In an effort to prevent their communities from becoming the next Dimock or Dish, New York state officials have held off on opening the Marcellus to drilling, pending a review. Late last year, the state's Department of Environmental Conservation (DEC) released a draft environmental impact statement, which aimed to supplement drilling regulations that have been in place since 1992. The two-month public comment period drew about 14,000 comments, including some from the EPA, the Natural Resources Defense Council and elected officials. Comments are still under review, and a final version of the draft will likely be released in the fall.

The issue is of particular concern to residents in New York City and Syracuse, two of a small number of US cities with a special permit to provide unfiltered surface water for drinking. Drilling in upstate watersheds could place the cities' water supplies at risk and create the need to build billion-dollar water treatment plants. In April the DEC announced that any Marcellus drill permits within the New York City and Skaneateles Lake (Syracuse) watersheds will undergo a separate, far more rigorous environmental review.

It's a step in the right direction, says State Senator Tom Duane, but it's a potentially divisive move for New York. As Duane sees it, residents of New York City and Syracuse are protected from the stress and destruction of hydrofracking, but those in rural upstate areas remain vulnerable.

Duane and State Assembly member James Brennan intro-

duced twin bills earlier in the year that seek to put a two-year hold on issuing permits and ban drilling within certain distances to drinking water supplies. It's his mission, Duane says, to deter—if not ban—drilling in the state, as any revenues from drilling would quickly be eaten up by road repair and other costs. "I don't believe that there's a way to safely do hydraulic fracturing," he says. "I'm skeptical that you could ever find a way, but I don't want to say that it's impossible."

Similar concerns have been bubbling up at the federal level. Last summer Colorado Democratic Representatives Diana DeGette and Jared Polis, along with New York Democrat Maurice Hinchey, introduced the Fracturing Responsibility and Awareness of Chemicals (FRAC) Act, which aims to close the Halliburton Loophole and revive the EPA's power to regulate or prohibit fracking fluids. Pennsylvania Democrat Bob Casey signed on as the Senate sponsor. After the twin bills were introduced, they were sent to California Democrat Henry Waxman, chair of the House Energy and Commerce Committee, who opened an investigation in February. On Hinchey's request, the EPA launched its own investigation. (New York State Assembly member Steven Englebright introduced a bill in April to ban hydrofracking in the state until the EPA finishes its study.)

The federal push to regulate hydrofracking may have gotten an unexpected boost in the wake of the Deepwater Horizon explosion. "The situation in the Gulf of Mexico is a grave reminder of the dangers posed by energy extraction," Casey says. "Natural gas drilling in Marcellus Shale in Pennsylvania has the potential to be a great economic boon for the Commonwealth. But we must take the proper steps to make sure it is done in a way that benefits Pennsylvanians and protects drinking water. Pennsylvania can reap the benefits and not be left with the burden on our infrastructure, health and safety." Hinchey agrees that the offshore oil spill should prompt legislators to pay more attention to drilling on land. "Drilling is important, the production of energy materials is important," he says. "But it's also critically important that it be done carefully and effectively in ways that are not going to be harmful."

Can fracking be done safely and justly? Hinchey says yes—as long as it's properly regulated. In keeping with that stance, the Kerry-Lieberman American Power Act does not call for an outright ban on hydrofracking. But the much-anticipated climate change bill, introduced on May 12 against the grim backdrop of the BP disaster, does include tough language calling on drilling companies to divulge fracking chemicals.

Fuller, of the IPAA, says disclosing chemicals would not keep people or the environment any safer. He says groundwater is protected through the construction of cement casings around wells, which close it off from the methane and the fracking fluids flowing through the well. "The assertion that you cannot protect the environment and fracture natural gas wells is totally inconsistent with the reality," he says. "The well construction process is what really protects groundwater, and it is a very effective process."

But in Dimock, proper well casings didn't stop 8,000 gallons of fracking fluid from spilling onto a local farm. And that Dimock well explosion? The Pennsylvania Department of Environmental Protection (DEP) determined that improper well casing was to blame. It's not an isolated incident: improper well casing was also at fault in a 2007 explosion in Bainbridge, Ohio, that blew a house off its foundation and left yet another neighborhood without drinking water.

For months after the Dimock drilling error rendered wells unusable, Cabot Oil and Gas denied any connection to the contamination, and in March the DEP determined that hydrofracking was not at fault. It's a technicality that drilling companies and lobbyist groups commonly use to dodge accountability, and they have a point. In many instances, it's not the physical act of fracturing that contaminates the well—all the more reason, advocates argue, to put the entire process under closer scrutiny.

If fracking is here to stay, as some argue, then more effort should be made to minimize the harm it can cause. There are ways to frack using nontoxic chemicals and even air, for example, which would pose less risk to drinking water. That's a start, but it wouldn't solve the problems of fossil fuel output, pollution or the presence of wells and compressor stations up to 100 feet from homes. Nor would it address compulsory integration and mandatory pooling, which in New York and Ohio allow companies to drill beneath an unsigned person's land if his or her neighbors have all signed leases. The Halliburton Loophole is not the only one that needs to be closed.

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For Switzer, the fight to protect her community has become a full-time job. She's given that bumpy tour around Dimock to Dish Mayor Calvin Tillman, grassroots organizers and DEP officials, and she has testified in Pennsylvania Senate hearings. She's not alone in her quest. Citizen action groups have popped up all over the Marcellus region, including the Shaleshock Action Alliance and the Pennsylvania-based Damascus Citizens for Sustainability, and around the country. On May 26 As You Sow, a shareholder advocacy organization representing the Park Foundation of Ithaca, won support from a surprising 26 percent of shares at ExxonMobil's annual meeting for a proposal that would have required the company to disclose its efforts to reduce risks from natural gas drilling. "The Gulf oil spill is a powerful example of how oil and gas drilling can devastate the environment," Park Foundation executive director Jon Jensen wrote in a statement. "This is a good first step in responsibly seeking energy in a way that protects the environment, human health, and the welfare of the company."

Switzer says that at the very least, there should be a national moratorium on drilling while the federal investigations are being conducted. But even if regulations are ultimately implemented, she says, Dimock is already a casualty. It was the first, she says, but it may not be the last. ■